REMARKS

Claims 1-19 and 59-76 are pending in the present application. Claims 50-58 have been withdrawn. Claims 1-11 have been canceled. New claims 77-90 have been added. Claims 1-11 and 59-76 have been rejected under § 112 as being indefinite. Claims 1-19 and 59-76 have been rejected under § 103 as being unpatentable over Pahlman et al. (US 6,579,507) (Pahlman) in view of Beer et al. (US 5,443,805) (Beer).

Section 112 Rejections

Claims 1-11, 64, and 73 have been canceled, making rejections to these claims moot.

The Office Action has alleged that Claims 59-76 are indefinite, as to what would constitute a "model" of the combustion system. Independent claims 59 and 66, along with certain dependent claims, have been amended to recite "computer model." The Specification describes in detail examples of computer models of combustion systems. Applicants therefore assert that these claims are definite.

The Office Action has alleged that Claim 59 is indefinite, as to what would constitute an "increased population of fine particles below 5 microns." Amended claim 59 recites an "increased population of fine particles below 5 microns compared to the combustion system without the modifications." Applicants therefore assert that these claims are definite.

The Office Action has alleged that Claims 59 and 66 are indefinite, since there is no antecedent basis for "the computer model." Amended claims 59 and 66 provide antecedent basis.

The amendments to the claims mentioned in the previous three paragraphs were not made in response to any prior art rejections.

Dependent claim 75 has been amended to recite "to determine optimal concentration and size of the particles to be injected." This amendment to claim 75 was made to make the claim more clear, not in response to any rejections.

Prior Art Rejections

Claims 1-19 and 59-76 have been rejected under § 103 as being unpatentable over Pahlman in view of Beer. As mentioned above, claims 1-11 have been canceled, making rejections to these claims moot.

Pahlman discloses a system for removal of pollutants, from combustion and other industrial process gases and processes utilizing the system. Process parameters are controlled by electronic controls to maintain minimal system differential pressure, and to monitor and adjust pollutant removal efficiencies. A control and data acquisition system (FIG. 16) is used to control and monitor the system. Beer discloses using the injection of an additive to reduce pollutants. Beer also discusses preheating combustion air.

In contrast, the present invention relates to methods for use in combustion systems for capturing gas phase pollutants such as SO_3. The invention uses a computer model to model various parameters of a combustion system, in which particles are injected into the combustion system to capture the gas phase pollutants. The computer model is used to determine things, such as, optimal particle injection locations, optimal size and amounts of the particles to be injected, etc., as well as to predict the impact on the pollutants by injecting the particles.

Claim 12 recites a method of capturing gas phase pollutants in a combustion system including "creating a computer model of the combustion system for modeling various parameters in the combustion system, including flow patterns, temperature patterns, and condensation reactions," "using the computer model to predict the impact on gas phase pollutants by injecting

particles into the combustion system, and to predict the impact on gas phase pollutants by the particle size distribution and the amount of injected particles in order to reduce the pollutants to a desired level," "using the computer model to determine one or more optimal locations in the combustion system for the injection of particles," "using the computer model to determine an optimal size and amount of particles to be injected," and "injecting the determined amount and size of particles into the combustion system at one or more of the determined locations to capture gas phase pollutants in the combustion system."

Pahlman in view of Beer does not teach or suggest the method of claim 12. The Office Action alleges that Pahlman discloses a system "wherein a computer model is made of the combustion system to control and monitor the process." The Office Action admits that Pahlman does not specifically disclose that the computer model determines optimal injection locations or is used to perform modifications or to configure the combustion system (but that it would be obvious to use a model in the process of Pahlman to determine optimal injection locations or perform modifications). The system of Pahlman discloses the use of computers, but for controlling and monitoring the system. (Col. 28, lines 4-6). It is unclear to Applicants how a computer used for controlling and monitoring a system constitutes a "computer model" for "modeling various parameters in the combustion system, including flow patterns, temperature patterns, and condensation reactions", as recited in claim 12. Applicants assert that a computer model as recited in claim 12 is not equivalent to a computer used to control and monitor a system. In contrast to the Pahlman computer that controls and monitors a system, the invention uses computer model simulations to determine the amount and location of injected material (among other things). (Spec., para. 20, lines 4-5).

For at least these reasons, applicant asserts that claim 12 is allowable over the prior art. Since dependent claims 13-19 depend from claim 12, it is also believed that these claims are allowable over the prior art.

Amended claim 59 recites a method of capturing gas phase pollutants in a combustion system downstream of a combustion zone including "creating a computer model of the combustion system that predicts the temperature gradient and location in the combustion system where the critical phenomena of condensation of gas phase pollutants occur", and "using the computer model to predict the effect of modifications to the combustion system, wherein the size distribution of resultant ash particles in the combustion system has an increased population of fine particles below 5 microns compared to the combustion system without the modifications."

Like with claim 12 discussed above, Applicants assert that Pahlman does not teach or suggest a computer model, as recited in claim 59. For example, Palman does not teach or suggest creating a computer model that predicts the temperature gradient and location in the combustion system where the critical phenomena of condensation of gas phase pollutants occur, or can be used to perform modification s to the system.

For at least these reasons, applicant asserts that amended claim 59 is allowable over the prior art. Since dependent claims 60-63 and 65 depend from amended claim 59, it is also believed that these claims are allowable over the prior art.

Amended claim 66 recites a method of capturing gas phase pollutants in a combustion system including "creating a computer model of the combustion system that predicts the temperature gradient and location in the combustion system where the critical phenomena of condensation of gas phase pollutants occur," "using the computer model to configure the combustion system, including determining optimal distribution of particles and particle injection

locations in the combustion system to enhance the heterogeneous condensation of gas phase pollutants onto the injected particles," and "injecting particles into the combustion system at one or more locations, wherein the size of the particles and the location of the injection are chosen such that pollutant condensation occurs primarily on the injected particles."

For at least the reasons set forth above, applicant asserts that amended claim 66 is also allowable over the prior art. Since dependent claims 67-72 and 74-76 depend from amended claim 66, it is also believed that these claims are allowable over the prior art.

New claim 77 recites a method of capturing gas phase pollutants in a combustion system downstream of a combustion zone including "creating a computer model of the combustion system that predicts the temperature gradient and location in the combustion system where the critical phenomena of condensation of the gas phase pollutants occur," "using the computer model to determine optimal size distribution of particles and locations to inject particles into the combustion system to enhance heterogeneous condensation of gas phase pollutants onto the injected particles," and "injecting particles into the combustion system at one or more of the determined locations."

For at least the reasons set forth above, applicant asserts that new independent claim 77 is also allowable over the prior art. Since dependent claims 78-90 depend from new claim 77, it is also believed that these claims are allowable over the prior art.

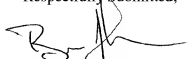
Conclusion

It is respectfully submitted that all claims are patentable over the prior art. It is further more respectfully submitted that all other matters have been addressed and remedied and that the application is in form for allowance. Should there remain unresolved issues that require adverse action, it is respectfully requested that the Examiner telephone Bruce A. Johnson, Applicants'

Attorney at 512-301-9900 so that such issues may be resolved as expeditiously as possible.

Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17 to deposit account number 50-3864 (Johnson & Associates).

Respectfully Submitted,



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